Incidence of Abnormal Metabolic Parameters in Patients Receiving HAART

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With the advent of triple-drug Highly Active Antiretroviral Therapy (HAART) in the mid 1990's, the initial approach to the management of patients infected with Human Immunodeficiency Virus (HIV) became one of "hit early, hit hard". However, many patients are intolerant of the significant side effects of antiretroviral regimens. As a result, they may not be adherent to their prescribed therapy, or these therapies have to be discontinued early. The end result is often uncontrolled viremia, and / or higher risk of virus mutation and development of resistance. Eventually, treatment options become fewer, and patients are left with compromised organ functions as well as lack of effective and tolerable regimen.

Recently, the approach in treating HIV infections has become more conservative, with antiretroviral therapy generally indicated when the patients are symptomatic or when their CD4 count falls below 200 cells/μL. Combination therapy such as the highly active antiretroviral therapy (HAART) is utilized with proactive measures in order to maximize tolerability of the treatment. Specifically, prophylactic antiemetic or antidiarrheal medications help patients adhere to their regimen so that the antiretroviral potency can be ensured. Since the advent of HAART, survival of HIV-infected persons has dramatically improved. Currently, the focus of HIV management is on viral control and minimizing the adverse effects associated with HIV and HAART, including metabolic abnormalities.

At the Los Angeles County Medical Center (LACMC), patients seen at the HIV Drug Optimization Clinic (HIV DOC) undergo extensive evaluation of their HAART regimen and concomitant therapies that are necessary to minimize cardiovascular risks. The problems of hypertension, dyslipidemia, diabetes, etc., are routinely addressed and monitored. A team approach is used, with active discussion among the primary physicians, psychiatrists, physician assistants, nurse practitioners, pharmacists, nurses, dietitians, social workers, and patient advocates.

In a retrospective study done by the clinic pharmacists, a cohort of HIV-infected patients with diabetes was followed for approximately six months. In this evaluation, the prevalence of risk factors leading to potential cardiovascular problems was identified in thirty-eight patients. Obesity was present in 10 (26%) patients; hypertension was present in 17 (48%) of the cohort; hypertriglyceridemia occurred in 31 (86%) patients; and low HDL levels were present in 14 (37%) patients.

When the number of concomitant cardiovascular risk factors was considered, it was found that a much higher rate of metabolic abnormalities was present in this HIV-infected diabetic cohort than in the general public identified in the NHANES III report. Including diabetes, one patient had 5 risk factors for the metabolic syndrome; 10 patients had 4 risks, and 13 had 3 risk factors. According to the definition of metabolic syndrome, a patient is identified as having metabolic syndrome when he/she has 3 or more concomitant risk factors. In our analysis, 24 (63%) patients

fit the criteria for metabolic syndrome. This is in contrast to the prevalence of 23.1% prevalence of metabolic syndrome in the NHANES report.

Based on our data, it can be concluded that the incidence of metabolic syndrome is much higher in patients with diabetes and receiving HAART, conditions shared by many patients in our study cohort. We should be aware of the potential effects of glucose intolerance and dyslipidemia brought about by long-term HAART, and the higher risk of cardiovascular events in this patient population, as evident in our data. The choice of HAART may be based on potency, tolerability, as well as low potential of inducing metabolic abnormalities. In addition, the approach to diabetes management in these patients needs to be aggressive in achieving strict glycemic control and targeting recommended blood pressure, lipid, and weight goals. Due to the effectiveness of HAART and the anticipated prolonged survival, it is reasonable for a patient with HIV to expect a good quality of life without suffering from cardiovascular complications. With this goal, it may be desirable that patients receiving HAART be evaluated (and treated, if necessary) by a team of metabolic specialists so that these goals can be realized.

Table 1. NCEP / ATP III Criteria for Metabolic Syndrome

Parameter	**Comments**
Abdominal obesity	Waist-to-hip ratio
Hypertriglyceridemia	>= 150 mg/dL
HDL	< 40 mg/dL in men; < 50 mg/dL in women
Fasting plasma glucose	>= 110 mg/dL
Blood pressure	> 130/85

* 3 or more of criteria positive is defined as having metabolic syndrome

Table 2. Incidence of Metabolic Abnormalities

Abnormality	**Parameters**	**Number (%) in HIV DOC**	**Number (%) in NHANES III**
Obesity	BMI >= 30	10 (26%)	(38.3%)*
Hypertension	BP >= 130 / 85	17 (48%)	(32.2%)
Hypertriglyceridemia	TG >= 150 mg/dL	31 (86%)	(30.2%)
Low HDL	HDL < 40 men, < 50 women	14 (37%)	(37.9%)

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* NHANES and NCEP/ATP III reports abnormality as abdominal obesity

Table 3. Percentage of Patients on Protease Inhibitors and Not on Metformin

	On Protease Inhibitors	Not on Metformin
Number of patients (%)	**25 (66%)**	**24 (63%)**

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